

Theodor Baumann

THE SOLUTION OF THE EINSTEIN EQUATIONS

THEODOR BAUMAN

The solution of Einstein equations



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Theodor Bauman:

The solution of the Einstein equations

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foreword

"A new scientific truth does not usually assert itself in such a way that its opponents are convinced and declare themselves educated, but rather by the fact that their opponents gradually die out and that the rising generation is familiar with the truth from the outset. " Max Planck

Of course, this book is not free from inaccurate assumptions and wrong conclusions. In addition to informational enrichment, it is to be understood as a suggestion for one's own research in order to gain a deeper understanding of our world, with answers often raising further questions. Sources have not been cited, as research can be carried out efficiently using a web search.

The Observers

The existence of the universe depends on beings like us humans. Without observation there is no universe that can be observed. Observation as an interaction with the environment is therefore the basic prerequisite for all knowledge and insight.

Physics is considered the mother of sciences. It deals with the measurement of individual and connected particles and the forces acting between them by observers. A best possible understanding of the human observer in the Rah

It is only possible to understand the limited cognitive ability of his consciousness and his susceptibility to errors and illogicality if physical, biological, sociological, psychological and philosophical aspects are taken into account. The human observer's brain is the center of knowledge formation. It has around 100 billion interconnected nerve cells. Its functionality is based on quantum mechanical rules, some of which are incomprehensible to us.

An example of the importance of the brain is the sea sheath. It initially develops in a similar way to humans in the embryonic stage, forming eyes and a fin in order to orientate itself and move forward in the sea.

move until she finds a rock to hold on to permanently. Then she regresses her eyes and fin and digests her brain as she no longer needs it.

Man has his brain primarily for locomotion of his body to find food more effectively and to reproduce better, combined with the exchange of information about his environment, but not to understand the laws of space. Locomotion is why dolphins have larger brains than humans, in large part it controls swimming movements. A tree therefore needs a brain just as little as a sea squirt clinging to a stone.

A practical example of the evolutionary path towards greater connectivity for information sharing is road transport in India. Information about traffic is vital, especially for city dwellers. Vehicles localize themselves there by honking. The average Indian driver honks between 1,000 and 2,000 times an hour in the city, some significantly more often. Anarchy prevails in road traffic, where the law of the strongest applies. A larger vehicle such as a truck usually has a larger, deeper-sounding horn, while a smaller one, such as a motorcycle, has a higher-pitched one. at the loud

You can see the distance from the intensity and the speed in your own direction from the change in volume. This is reinforced by the ability to hear in stereo since we have 2 ears. Professionals can even use the Doppler effect, which allows them to estimate at leisure how fast a vehicle is moving by comparing the pitch against the vehicle's pitch, which they know. The lateral direction of movement can be recognized by the local change in the sound. With a little practice, it is possible to know quite well which vehicle is moving from which direction, at what speed and where, even without visual contact. For example, a truck driver who is in a hurry can drive through a busy pedestrian zone at around 30 km/h, honking his horn, as people make room to avoid getting under their wheels. So in India there is a higher level of localization. This is associated with a life-sustaining evasive reflex for pedestrians and occupants of smaller vehicles, since drivers of larger vehicles are aware of their size and do not swerve because they know that smaller vehicles have to swerve and think they know it too. In case they got it wrong, large vehicles usually have a so-called cow catcher in front of their front. It only gets bad if both drivers think they are sitting in the larger vehicle, as both thought the other had to swerve. This connected behavior

Case of particular urgency, analogous to the quantum tunnel effect, even with a motorized rickshaw, also known as a tuk-tuk. The driver drives flat out into oncoming traffic as he feels the larger vehicles can and probably will give way as in an accident police tend to blame the driver of the larger or more expensive vehicle as that is where most of the time more fine is to be collected.

Space

There is no basis for the assumption that the universe is limited in space, in the number of its particles or in time, but there are strong indications for its spatial limitations. However, the assumption of spatial and temporal limitations is widespread, since our brains are not made to understand infinity. After all, everything in life has a beginning and an end, including life itself.

In addition to the size and luminosity of distant objects, the size of the universe is derived from the shift in the photon spectrum of the observed objects into the red range. The galaxy with the factor 10.3 as the largest detected redshift so far is located 13.2 billion light years away and was discovered by the Hubbel telescope. Since light took about 13.2 billion years to reach us, and the galaxy appears to be flying away from us at about 93% the speed of light, it would already be over 25 billion light-years away had it not slowed down or accelerated significantly. However, only if the redshift is caused by the velocity and not by gravity of distant non-visible objects, which is indistinguishable according to the principle of inertial mass equals gravitational mass. Otherwise this galaxy would be

much closer. The fact that space has changed is a product of the Big Bang thesis. According to our observations, it appears to be isotropic and therefore looks largely the same everywhere, which leaves physicists puzzled as to how it can be that there are galaxies at the edge of space and thus, according to conventional wisdom, already a few hundred million years after the Big Bang like ours, which is also said to have originated not long after the alleged Big Bang and the universe, despite the greatly increased distances between the galaxies, does not seem to have changed significantly since

There are 2 physical explanation models for the universe, the theory of relativity and the quantum theory.

The theory of relativity is not valid indefinitely. It fails on the smallest scales and collapses at the event horizon of a black hole by showing infinite values for fundamental quantities such as momentum and space curvature. If an astronaut allowed himself to fall towards the hole, he would reach the speed of light when he reached the edge of the hole, the event horizon of time relativity is infinitely slow for an observer outside the black hole and thus comes to a standstill.

Quantum theory is incomprehensible to us, since small particles such as photons, electrons, but also Atoms and molecules, because of their wave properties, behave as if there were many until they collide with another particle wave and close again become individual particles. This is called wave-particle duality. Reality arises through the interaction of an observer by causing particle waves to collide. Then the wave collapses independently of time, which means at infinitely high speed, and the particles become real.

The components of the universe

The universe consists of 38 distinguishable basic particles including antiparticles. 12 quarks, 6 leptons, 6 neutrinos and Higgs as well as the carrier particles of the 4 forces with which the particles interact through energy exchange. 8 gluons, photons, W^+ , W^- and Z particles and gravitons. Particles with the same properties cannot be distinguished and therefore have no identity. For example, if 2 electrons are considered in a closed system, it is not possible to distinguish between an electron a and a b because there is no way to mark them.

The particles are described using the standard model of elementary particle physics. The Standard Model does not explain why there are several generations, why particles and forces have precisely these and not other properties, and why there are particles at all.

The visible matter of space consists of about 90% hydrogen and 10% helium, with about 99% being in the plasmatic state. The other elements make up only about 0.1%.

Here is an overview of the particles that do not transfer forces, with their properties:

cottage cheese

They are the components of the atomic nucleus and the only gene particles that are influenced by all 4 forces. They have not yet been shown to have a rest mass, although they could have one, although according to the Standard Model they are considered to have no rest mass. Protons and neutrons are made up of them

quantity set. Quarks only appear in groups, which is because when quarks try to separate between them, other quarks are created, which strengthen the bond through coupling processes of the gluons acting between them. look

like a rubber band that gets thicker the further you pull it apart. In order to generate free quarks, an infinite amount of energy would be needed. There are 3 generations.

The 1st quarks that make up the proton and neutron are called up and down. The 2nd strange and charm, the 3rd bottom and top. Only the 1st generation, which makes up protons and neutrons, can form stable particles over long periods of time. For a free neutron that is not bound to an atomic nucleus, the half-life is just under a quarter of an hour at 877.75 s. Then it decays into a proton, an antineutrino electron and an electron. The proton is also included

not stable with a high probability, although it is considered stable according to the Standard Model. His pre-

The visible half-life is so long that it has not yet been possible to determine it and is more than 10^{32} years. A proton would decay into a positron and a pion consisting of 2 quarks. For every quark and every particle formed from it, there is an antiparticle. Quarks have another property called flavor, of which there are 3 different ones, and can only form stable particles if the sum of their flavors is neutral.

leptons

They also occur in 3 generations, electron, muon and tauon, which carry a negative charge, and as their positively charged antiparticles positron, antimuon and antitauon, of which only the 1st generation, electron and positron, is stable. A corresponding neutrino belongs to each generation of the respective particle. Subsequent generations decay after a short or very short time, resulting in a muon neutrino, an electron antineutrino and an electron.

Higgs

Is a particle that was specifically searched for and, as hoped, could be detected at the Cern nuclear research center. It gives the particles their mass. Higgs part

Fields are excited states of the field of the same name and are not stable, so they decay quickly.

neutrinos

They are electrically neutral and can move freely through atoms as long as they don't hit the nucleus, which is why they are called ghost particles. They interact exclusively via the weak nuclear force and were discovered via beta minus decay. About 100 trillion fly through our bodies every second. The 3 types of neutrino can obviously transform among themselves. While gamma radiation with an energy of 2 MeV is reduced by 50% by a lead plate 13 millimeters thick, a lead layer of about 50 light years would be necessary for a 50% reduction in neutrino radiation.

Much of our world is virtual, meaning particles exist for such a short time that they cannot be measured directly. Virtual particles occur in all 3 interactions described in quantum mechanics. In the electromagnetic force, for example, the electrons are held on their orbits by virtual photons. By supplying energy, virtual particles can become real particles.

The forces of the universe

The electromagnetic force

It holds the atoms and molecules together and has

2 states of charge, positive and negative, making it attractive or repulsive. The photons they transmit differ from each other only in terms of their frequency. Photons with the highest frequency and energy and the correspondingly lowest wavelength are called gamma rays, which have a wavelength between around 380 and 780 nanometers. Photons are considered to have no rest mass, so they only move at the speed of light. They are not emitted continuously, but in specific wavelength ranges for each atom, so that their sum, known as the spectrum, can be used to determine which atoms are responsible for their emission. Your reach is unlimited. Photons are the basic building blocks of all particles produced by collisions of photons, including force-transmitting particles and the Higgs. Photons are therefore also the basic building blocks of the universe with sei

a creature. Everything consists solely of them.

We see through them primarily in the form of reflected

Light our environment when electrons in atoms

Emit photons and into a less energetic one

Jump back track after being energized by photons.

The strong nuclear force

It works only over subatomic distances within the Atomic nucleus and is made up of 8 distinguishable gluons transferred between the quarks. They hold the atomic nuclei together by preventing protons and neutrons from repelling each other.

Gluons cannot occur individually, only in neutral pairings and so-called balls.

The weak nuclear force

They are transmitted by means of two W particles and one Z particle. It has a very short range, so it acts mainly in the atomic nucleus in particle transformations and causes the radioactive beta decay of atoms. It seems to be responsible for the CP violation, which causes the excess of matter over antimatter that seems to make the universe possible.

The Gravity

It is considered the most enigmatic force, is by far the weakest of the 4 forces and is transmitted by means of gravitons that cannot be directly verified and are therefore hypothetical. There is no opposing force, what with a

certain energy or mass density leads to a gravitational collapse. Your reach is unlimited. By means of its carrier particles, it causes all particles to attract each other, even photons and gravitons, which means that gravitation becomes stronger than the other 3 forces. When it finally overcomes the strong nuclear force, space and time cease to exist and a black hole forms.

cosmic particles

The speed of light is also relative. It depends on the environment. The highest possible is the vacuum speed of light. Since there is no complete vacuum, it cannot be fully reached by photons either. When cosmic charged particles enter the Earth's atmosphere, they often travel faster than the speed of light in the atmosphere. They then emit Cherenkov radiation backwards in the form of gamma photons, like sound waves when a military jet breaks the sound barrier. A proton, which accounts for around 87% of cosmic radiation, can collide with molecules in the atmosphere to produce many protons whose total energy, however, does not exceed the energy of the original particle according to the law of conservation of energy. Cosmic particles can be part of a cosmic matter

cycle, which takes care of the necessary recycling in a universe with no time limit. A high-energy particle of cosmic rays, some of which is believed to be generated from jets from black holes or hypernovae, explosions of massive stars that form a black hole, has more energy than a bullet and could kill a human if it were his Energy could mainly deliver in it. Astronauts occasionally have

with eyes closed, noticed flashes of light that can be traced back to cosmic rays, in which a particle penetrates the spaceship and causes a light stimulus when it hits the retina in the eye. The range of protons at energies from just under 10 to the power of 20 eV is limited to less than 100 million light years because they collide with the cosmic background radiation, the so-called GMZ cutoff.

antimatter

It was predicted by Paul Dirac in 1928 and verified in 1932. When 2 photons with enough energy collide, a matter particle and an antimatter particle are created. For an electron-positron pair to form, the photons must have a total energy of at least 1.022 GeV, which corresponds to gamma photons. If this electron-positron pair collides, 2 photons are created with a total energy of 1.022 GeV, called annihilation. Energy and mass are of equal value here, as Einstein's most famous formula shows.

From an energy of 1.877 TeV, protons can form, the baryogenesis. A quark-gluon plasma is created with quarks and antiquarks, from which proton-antiproton pairs are formed, which when a pair collide again become 2 photons with an energy of 1.877 TeV.

With antimatter, time runs in the opposite direction, as illustrated by Feynmann diagrams. The apparent lack of antimatter in space is attributed to a symmetry breaking, the CP violation, caused by the weak nuclear force. The CP violation creates a small excess of matter of about 1 in a billion, which according to many physicists, however

is too small to explain the absence of antimatter. If space is 50% antimatter, strong gamma-ray emissions from pair annihilation reactions should be evident at the matter-antimatter boundaries, but this has not been observed. However, it cannot be ruled out that there are spatially isolated galaxies composed of antimatter, since the emitted light spectrum is the same. A compensation for this symmetry break is possible if there is an antimatter universe behind a cosmic event horizon as the outer limit of our universe, whose gravitation is called dark energy, in which time runs in opposite directions. The law of conservation of symmetry is a mirror- and time-symmetrical antimatter world in which every particle and thus every human being has its antimatter counterpart, which does exactly the same thing as he does.

However, this mirror world would not be accessible to us and is therefore speculative. However, it seems sufficient to maintain symmetry if the natural constants are identical in this hypothetical antimatter universe.

In this universe there would also be a cosmic event horizon behind which our universe is.

atoms

Atoms are the smallest units of elements that cannot be further broken down chemically. 118 elements are currently known, 90 of which occur on earth.

Atoms consist of a nucleus made up of protons and, except for the lightest element hydrogen, neutrons, which prevent the positively charged protons from repelling each other. Atoms range in diameter from 1 hundred millionth to 5 hundred millionths of a cm. The nucleus accounts for around 99.9% of the mass, but is only about 1/40/1000th the diameter of an atom and less than 1/60/trillionth the volume. The electrons move around this nucleus. These orbit it in specific orbits, according to the orbital model, with a limited number of electrons in each orbit. The innermost orbital is called the K shell and only accepts 2 electrons, the following L shell already 8 and the following M shell 18.

The outermost Q shell can hold 98 electrons. In the area of these orbital paths, the electrons have no determinable location, but only have a probability of being there. In addition, 2 electrons in one orbit cannot assume the same state, which is due to the Pauli prohibition

is expressed. When the energy is supplied by colliding with a photon, electrons are lifted to orbits further away from the center; when photons are emitted, they jump to an orbit closer to the nucleus. Electrons cannot stay between the orbital paths.

Atoms are completely and electrically neutral when the number of electrons equals the number of protons. If there are too many or too few electrons, one speaks of an ionized atom. The energy states of the electrons are expressed by 4 quantum numbers. The major quantum number indicates the size of the orbital, the minor quantum number indicates the orbital shape, while the magnetic quantum number indicates the spatial position and the spin quantum number indicates the angular momentum.

Light elements have the same number of neutrons and protons in the nucleus, while heavier elements require up to 1.5 times the number of neutrons to balance the repulsive forces of the protons. Elements can have different numbers of neutrons without changing their chemical properties. The variants are called isotopes. Elements that have more protons than lead are no longer stable due to the short range of the gluons as carrier particles of the strong nuclear force and are subject to radioactive decay.

This can either be via alpha decay, in which

Helium nuclei are released or beta decay, in which electrons and neutrinos are released, each accompanied by gamma radiation. Radioactivity is a statistical, quantum mechanical phenomenon that does not allow any conclusions to be drawn about the decay time of an individual particle.

Complete atoms can assume 3 states of aggregation, solid, liquid and gas, depending on their kinetic energy, which corresponds to their temperature. At high kinetic energies, the electrons are separated from the nuclei, which is referred to as a plasma, which is electrically conductive and is considered the 4th state of aggregation. At extremely low kinetic energies, atoms and even photons can enter the 5th lowest energy state in the form of a Bose-Einstein condensate, in which the particles behave as one. Because of their quantum mechanical properties, these condensates can interfere and tunnel.

The solar system

Our solar system is located in an arm of the Milky Way, about 28,000 light-years from the center. Our sun, which is moderately sized for a star and is therefore considered a yellow dwarf, and the planets are said to have been formed by the collision of a molecular cloud about 100 light-years in diameter with another molecular cloud about 4.6 billion years ago. At least one of these molecular clouds is said to originate from a supernova, with both clouds containing mostly hydrogen in addition to the heavier elements that seem necessary for higher forms of life.

The presence of a magnetic field in molecular clouds is another important factor. First it prevents collapse, but then it supports star formation. The molecular clouds were compressed by the pressure wave and collapsed under the influence of gravity until a temperature was reached in the center that enabled a fusion of the hydrogen atoms to form helium and the radiation pressure stabilized the collapse. The planets formed from surrounding condensation nuclei, which consisted primarily of heavier molecules, and since particles never fall onto the center of gravity at the same time, they fall past one another and orbit.

the center, which is why all the planets we see from the sunlight they reflect, and the sun, rotate about themselves. The Sun's rotation time at the equator is about 25 days, decreasing below the surface. The sun is from one

Surrounded by a corona of ionized plasma, which consists mainly of hydrogen and helium nuclei as well as electrons. The corona becomes visible to the naked eye during a solar eclipse and, at up to 4 million degrees Kelvin, is much hotter than the sun's surface at around 5,800 degrees Kelvin, although the cause is disputed, while the temperature in the sun's center is 15.7 million degrees is estimated. Eruptions, the so-called protuberances, can lead to technical faults and power failures on earth due to their particle streams. Due to a prominence in North America and Northern Europe in August 1859, such high voltages were induced that paper strips from telegraph receivers were set on fire and the Northern Lights appeared in Central Europe. Nowadays, these particles can lead to disruptions in the power grid by destroying transformers and damaging satellites. Prominences increase with the number of sunspots, which appear black due to their temperatures being up to 2,000 degrees lower. Sunspots occur periodically at intervals of about 11 years.

Of the planets, Jupiter, as the largest planet, has the shortest rotation time of less than 10 hours, which causes it to flatten considerably in the equatorial area, while Venus rotates the slowest with a period of around 243 days. The speed of rotation around the Sun is about 88 days for Mercury, the planet closest to the Sun, and more than 164 years for Neptune, the most distant one. In contrast to the inner 4 planets, the visible surface of the outer 4 planets, the so-called gas giants, is not solid, but consists of dense gases, mainly hydrogen as the lightest metal and the noble gas helium, which due to the high pressure inside in be in liquid or solid form. Most planets are orbited by moons, the number of which is currently given as about 80 each for the largest planets, Jupiter and Saturn. 4 of the planets are visible to the naked eye, with Venus being the brightest celestial body after the moon due to its small distance of 40,000,000 kilometers at maximum approach and its dense, strongly light-reflecting atmosphere.

Stars

Stars are only visible celestial bodies at night when the sky is clear, since the scattered light of the atmosphere outshines them during the day. If they are not planets orbiting our sun, they are distant suns that can be described as balls of gas. Asteroids can be seen as stars

be bare and, as they approach the sun and are thereby heated, trail behind them by evaporation of volatile substances, at which point they are called comets. Shooting stars are usually meteors when they burn up in the atmosphere, or meteorites when they reach the earth's surface. About 2 thirds consist of iron, the rest are stony meteorites of silicon with a high metal content, mainly nickel and iron, the remains of heavy, burnt-out stars.

Shooting stars larger than a few centimeters can be seen as a bluish glowing fireball. Due to their high speeds, large meteorites can cause considerable damage. If they come from our solar system, they reach a speed of up to 42 km/s in the area of the earth due to the sun's gravity. Since the earth orbits the sun at around 30 km/s, speeds of up to 72 km/s, corresponding to around 260,000 km/h, are possible, although before

the impact due to the highly compressed air, which is put into a plasmatic state and causes the nearby rock to vaporize, can create an impact crater that is many times the diameter of the meteorite.

The Tunguska meteor of 1908, whose diameter is estimated at 30-80 m, has a radius of approx

50 kilometers aroused worldwide interest, being already several kilometers high in the form of a explosion evaporated so that it did not leave an impact crater, suggesting that it was a less dense stony meteor or a comet. The impact of a meteorite about 15 km across, near the coast between North and South America about 66 million years ago, is blamed for the extinction of the dinosaurs, which facilitated the development of mammals.

Under good conditions, i.e. far away from the stray light of the cities, around 5,000 stars can be seen without technical aids. According to estimates, there are 250 billion stars in our galaxy, of which only about 5% can currently be observed. The higher the mass of a star, the shorter its lifespan. At 0.1 solar masses, this is about 3.16 trillion years, at 25 times that

The mass of the Sun is about 1 million times shorter at about 3.2 million years.

The stars glow due to the fusion processes taking place in them, which start at about 0.08 solar masses, whereby hydrogen is first converted into helium, which means that large quantities of photons, mostly in the visible light range, are emitted. Due to its gravity, a star also attracts hydrogen from its surroundings as additional fuel. After most of the hydrogen in the star's interior has been used up, the radiation pressure decreases and the star initially shrinks as the temperature increases. When the fusion processes come to a standstill in the center, hydrogen shell burning sets in, during which the fusions take place at the star edge zone near the surface

The star expands considerably and is called a red giant at this stage, until the next stage, when helium fuses into carbon. The duration of this process depends on the mass and is completed much more quickly than the previous fusion. Due to its relatively low mass, the Sun has completed fusion at carbon and ends up as a white dwarf. For a star with more than about 5 solar masses, the 3rd stage is the fusion of carbon to form the noble gas neon, which occurs after just a few thousand years

is completed. If approximately 10 solar masses are exceeded, oxygen, silicon and, as the last exothermic, energy-generating stage, iron are produced as further stages at a temperature of several billion degrees Kelvin, with this last stage being completed after a few hours to days and a density of up to 100 tons per cm^3 . The star then gravitationally collapses due to reduced radiation pressure and explodes in the form of a supernova, in which the additional energy fuses heavy elements such as lead and uranium and ejects them outward at up to about 99% the speed of light. The end product in the form of a neutron star is created in fractions of a second, whereby the electrons are pressed into the protons, the Pauli prohibition, according to which 2 electrons in an atom cannot assume the same state, is violated and degenerate matter is produced, corresponding to the reverse beta decay. The diameter of the resulting neutron star is only around 10–30 km, with an average density of 3,000 t/cm^3 . This consists of several layers, on the outside there is a hot plasma, followed by a layer of iron, then a layer of protons and neutrons as well as electrons. Inside there are supposed to be superfluid neutrons, which are probably present in the core as quark-gluon plasma, which has a density of up to almost one million

liarde tons per cm³ possesses. Shortly after the formation of the neutron star, the surface temperature reaches up to 100 billion degrees, but falls within 24 hours to around 1 billion degrees due to the emission of neutrinos. on its surface The gravity is more than 100 billion times higher than at the earth's surface. The initial rotation is only a few billionths of a second and continuously decreases to several seconds in very old neutron stars. In addition, they have a strong magnetic field that accelerates charged particles to almost the speed of light. Neutron stars with particularly strong magnetic fields are called magnetars. After the magnetic field has been shifted, which is up to 100 times stronger than in ordinary neutron stars, starquakes can cause so-called gamma-ray bursts in addition to the usual, largely constant gamma-ray emission, which are beyond of the atmosphere can be registered when the emission cone touches the earth. A supernova with a mass of about 25 solar masses creates a black hole, since the gravitation then also exceeds the strong nuclear force.

Stars are classified based on their color and temperature spectrum. The spectral classes of stars are marked with capital letters, particularly large stars with high color temperatures of up to 30,000 degrees Kelvin are given the designation

O star and have spectra with a high proportion of blue. Stars with the letter M, L or T are rather cool with a color temperature in the range of 1,000 degrees Kelvin and appear glowing red in the night sky.

The effective temperature can deviate significantly from the measured color temperature of a star. A good example of this is Vega, a class A0V star with a color temperature of 15,000 degrees Kelvin. However, the effective temperature of this star is 9,500 degrees Kelvin. The effective temperature describes the state variable of a celestial object. For all known stars, it has a direct effect on the spectral class, according to which the various celestial bodies are classified. Overall, there are the designations: A, B, F, G, K, L, M, N, O, R, S, T and Y stars.

Joseph von Fraunhofer had already discovered darkened absorption lines in the color spectrum of our sun in 1813. Based on this finding, all other stars could then be classified using their visible light spectrum.

The individual spectral types of the stars are broken down into three sub-types: basic classes: O, B, A, F, G, K, M, brown dwarfs: L, T, Y and red giants: R, N, S.

Some stars differ significantly from the other star types. They can then be very hot, for example, or particularly cold compared to most other stars. Many stars are already several billion years old, while new ones continue to be born

stars can be observed.

All stars seem to be surrounded by a more or less intense corona, which our sun can see with the naked eye during a solar eclipse.

If outbursts occur on a star, as a result of which matter can be thrown into areas far outside the corona as protuberances, additional amounts of energy are transported into space. Overall, the corona of a star is defined by different scattering processes, denoted by the capital letters F, K, L, and T.

Various areas where new stars are formed have now been documented by astrophysicists, such as the neighboring Orion Nebula, whose gas cloud is around 1,300 light years away from our galaxy.

Several hundred new stars are formed in our galaxy every year, although it is not one of the top producers when it comes to star formation. Galaxies in the visible region of space in which a large number of star formations can be observed are referred to as star burst galaxies. The researchers are still not in agreement as to which causes must be fulfilled for a galaxy to become a starburst galaxy and why fewer new stars are being formed in other galaxies. This is how numerous are formed in the Sculptor galaxy NGC 253

extraordinarily highly compressed and also extremely heavy stars. Although more than 11 million light-years away from the Milky Way, it is one of the closest starburst galaxies to Earth.

galaxies

Galaxies consist of a few hundred thousand to several trillion stars, a large proportion of which are likely to have planets. They can be hundreds of thousands of light-years across and often spiral in shape. However, there are also galaxies that are more elliptical or largely irregular. In their center, which is called a bulge, there is probably a black hole.

A spiral galaxy appears from a distance like a spinning disk. In the past, the term spiral nebula was also used for this type, which is the most common at around 70%. Most spiral galaxies have multiple arms. Around a spiral galaxy is the so-called halo. These are isolated stars and globular star clusters.

Our home galaxy is called the Milky Way. It is said to be around 13 billion years old and thus formed very shortly after the Big Bang, has a diameter of around 100,000 light years and is classified as a medium-sized barred spiral galaxy because it has a bar-shaped bulge. The central area can be seen in the night sky as a bright band.

It got its name from the ancient Greeks,

who associated many of their heroes and gods with the starry sky. The Milky Way is said to be Hera's dusty milk, which the goddess of Olympus shed while breastfeeding the hero Hercules. Among the spiral galaxies, about 30% do not have a bar-shaped structure like the Milky Way. Like many other spiral galaxies, the Milky Way is significantly thicker at its center at about 16,000 light-years than at the galaxy arms. It is part of the so-called Local Group, which also includes our neighboring galaxy Andromeda, which is visible to the naked eye as a milky smudge under good conditions and, at more than 2.5 million light-years, is one of the most distant objects without technical data tools are visible.

Galaxies have the strange property that their rotation speed decreases far less outwards than is to be expected from Kepler's laws based on their visible mass, which is why it is assumed that about 80% of the mass is invisible as dark matter. There is currently nothing to be said against the simplest explanation, that dark matter mainly consists of burned-out stars in the form of black holes, although there are various other, speculative explanations that invent additional particles such as WIMPs or, like MOON, change the law of gravitation. Astronomy goes

currently assumes a total number of galaxies in space of about 1 trillion. Within a galaxy there are not only stars around which individual planets orbit.

There are also significant amounts of molecular clouds, known as dust, gas or mist, which are mostly composed of hydrogen.

The oldest stars that astronomers have been able to observe to date are found as globular star clusters in elliptical galaxies, which account for about 13% of the total number of galaxies. A unique feature of this type of galaxies is the fairly uniform brightness in all areas. They are probably formed when two or more galaxies collide and then merge. Compared to spiral galaxies, elliptical galaxies are surrounded by significantly more globular star clusters. When the stars move in them, it is noticeable that they do not move in orderly orbits around the center, but rather without any recognizable connection.

Few new stars are formed in these galaxies.

If a galaxy does not fit into one of the categories already described, it is classified as irregular. These have no spiral arms and the shape is neither spiral nor elliptical. Of the galaxies known to date, only around 4% are of this type. Compared to the other galaxies, they shine

irregular representatives are less bright. However, more new stars are formed in them and they tend to be richer in molecular clouds.

Objects with dimensions between smaller star clusters and the larger types of galaxies are called dwarf galaxies. These small galaxies often accompany larger ones as satellites like the moon does with the earth. In the case of our Milky Way, for example, it can be observed that the Magellanic Clouds follow it at a constant distance. According to the current state of science, these structures are two irregular dwarf galaxies. An exact classification is difficult in this case, since the blue brightness in particular allows several possible classifications. A large part of the galaxies discovered so far are dwarf galaxies. To date, 24 dwarf companions have been observed around our Milky Way.

Galaxies often appear in groups and form what are known as galaxy clusters. These can be assigned to even larger structures, the superclusters. In between there are cosmic empty spaces, the so-called voids. Compared to the distances between individual stars, the distances between the galaxies and the size of the voids are relatively small. The distance between the Andromeda galaxy and our Milky Way is only 25 times its diameter, while the distance of the star closest to the sun, at a good 3 light years, is more than 15 million times

of the sun's diameter, which is why hardly any stars collide directly with each other in galaxy collisions.

How galaxies move in space can be calculated mathematically using the visible redshift. Modern technologies with three-dimensional display options now make it easier to create maps of galaxies on the computer. At the transitions of the cosmic voids there are more spiral-shaped, but also numerous irregular galaxies. In some voids, astronomers have observed delicate bands of galaxies. Here han

are primarily compact dwarf galaxies.

It currently appears that elliptical galaxies and barred spiral galaxies, on the other hand, are mainly present where there is a high density in space.

One aim of the investigations is currently to establish a causal connection between the distribution of the galaxies in space and their mass distribution.

The presumed values for the mass of the Schwarzer Löcher in the galaxy centers and the total mass of galaxies differ considerably, which can be attributed to measurement inaccuracies. Recent measurements have shown that our neighboring galaxy Andromeda is not three to ten times heavier, as previously reported, but rather has a similar mass to our galaxy.

Astronomers observe very few galaxies that are isolated in space. It can be observed that our Milky Way and the neighboring Andromeda galaxy are moving towards each other at around 120 kilometers per second, so that a collision between the two galaxies can be expected in around 4 billion years. It will take another 3 billion years for the final result of the collision to form. In simulations with 3D software, two new galaxies have formed, one elliptically shaped and one polar ring galaxy, as is often the case with mergers of two or more galaxies.

The quantum mechanics

Quantum mechanics, also known as quantum theory, was developed in 1925. It's an example of our cognitive limitations, as anyone who understands says it's incomprehensible because it defies our logic, since one of its characteristics is that it's non-local. An example is the wave-particle duality, which one cannot really understand and simply has to accept. In the case of the double-slit experiment, a classic way of illustrating quantum mechanical rules, it does not matter how many particles occur in which time when it comes to the formation of the interference pattern. Even if individual particles are allowed to fly through the double slit years apart, an interference pattern forms. The particle dissolves and its location becomes a location probability. It only becomes a real particle again when it is measured, where it comes into contact with another particle that is needed for a measurement. According to the Copenhagen interpretation by Niels Bohr and other physicists from 1927, a particle only has a defined state through measurement. Before a measurement, there is only one probability of the particle being present, which, in addition to fixed, unchanging quantities such as its momentum and spin, contains an unpredictable component which, given the same

different results occur depending on the initial conditions. Another quantum mechanical phenomenon is entanglement, in which 2 particles generated at the same time behave like one. If an entangled pair of photons is spatially removed from one another without coming into contact with other particles, the entanglement, also known as coherence, is retained, whereby the states of the particles are also only defined by measurement here. Before that, the status is indeterminate. An entangled pair of photons, in which the photons have opposite spins, and it is not known which photon has which spin, is only fixed in its spin when one of the photons comes into contact with another particle, with the spin of the 2nd particle being photons at the time of measurement, no matter how far away the photons are. The elimination of the entanglement does not appear to happen locally and therefore infinitely fast for the external observer, while photons and other particles without rest mass move at the speed of light for the external observer, whereby these particles in their own reference system, i.e. for themselves, infinitely fast because neither space nor time exist for them. The uncertainty relation plays no role here as long as no quantum-mechanically coupled values are to be determined. If the spin of the other particle is determined by measuring the spin of an entangled particle, then one knows exactly how the spins relate to one another

behavior, but when measuring the momentum of a particle, the uncertainty must be taken into account, so that the position of the particle cannot be determined with unlimited precision.

One explanation for the wave character and the phenomenon of entanglement is the presence of a conductive medium, also called ether. These can be virtual matter-antimatter pairs that arise spontaneously in space as vacuum fluctuations and transmit the momentum of particles. An alternative possibility is that the impulse is passed on by stationary photons that completely fill the universe. According to an approach derived from the constants of nature, their number would then be 1.692×10^{122} , with their distance from the lowest possible wavelength of 7.87×10^{-15} m with a rest mass of 1.183×10^{-69} corresponds to kg. However, there is no evidence that a key medium is present.

As in the case of a water wave, the particle itself does not move. This is illustrated, for example, in the pendulum game in which several balls are suspended from ropes in a row and touch each other. If a ball is lifted and, after being released, hits the other balls attracted by gravity, the momentum is passed through the balls and the last ball

in the row takes off, only to swing back again due to gravity and let the first ball take off. If 2 balls are lifted off this pendulum and used to hit the other balls, 2 balls will be lifted off at the other end of the pendulum. 3 balls lifted will make 3 balls lifted at the end of the row and so on. The momentum of the entire system is passed on, whereby the movement soon comes to a standstill due to air friction and the conversion of the movement momentum in the balls into heat.

A photon pulse becomes a photon again, a proton pulse becomes a proton again, and a molecule becomes the same molecule again through rematerialization when it comes into contact with another particle.

An upper limit of the wave character of molecules is not yet known, the maximum achieved so far are molecules with 2,000 atoms.

Elementary particles have no internal structure because there are no photons inside. They are 2-dimensional spherical surfaces made of bound photons, but in classical physics they are often assumed to be point-shaped. The explanation based on the holographic principle is that the momentum of a particle is transmitted in coded form on a two-dimensional surface. When we observe distant galaxies, collapses

the wave function of the photons only now, after billions of light-years of travel through space, while no time has passed for the photons themselves. Before the collapse, the photons were in all possible places that could be reached at the same time, according to the probability of being there within the framework of their wave function. In an entangled pair of photons, by measuring one, the polarization of the other photon can be determined because they were never separated by themselves. Space and time only exist for us observers. Our space-time, perceived as 4-dimensional, corresponds to a 2-dimensional surface on which there is no time. Space and time are thus phenomena that are created by our existence and do not exist for quantum mechanical objects such as photons and atoms. Einstein called the time just before his death an illusion. In the case of electrons and even atoms and molecules, which can also entangle and interfere, a spooky long-distance effect, as Einstein called it, has been proven, whereby effects also take place infinitely quickly outside of the particles' own reference system for external observers, in However, in classical physics, the speed of light is the upper limit of information transmission speed.

All interactions of the observer in which particle impulses are exchanged with him or via one observed by him

come into contact with another observer or a measuring device are physically a measurement of particles. A measurement that makes a particle real by collapsing its wave function occurs, for example, when a photon hits our retina and causes a nerve stimulus. We call that seeing. Thus, it is we who, with our consciousness, cause our environment to take shape. We are the so-called hidden variable in quantum mechanics.

The Uncertainty Principle

It was formulated mathematically by Werner Heisenberg in 1927 and is considered more fundamental than the theory of relativity. In equations, it shows that the measurement accuracy of certain size pairs is limited to a certain amount, since the measurement using another particle, due to the interaction of the particle to be measured with the other particle, influences the path of the particle to be measured uncontrollably. Descriptive of how billiard balls in a dark room, one of which is set in motion and if another is hit, the impact sound can be used to calculate how far away it was, at what angle it was hit, and how far and at what angle it was hit deflected and its speed, but not in which direction it was deflected, unless it collides with another ball or the boards. We ignore the fact that this is possible in principle with billiard balls as 3-dimensional and therefore sound-reflecting bodies through precise sound analysis.

The location of the atom can be determined by measuring up to the wavelength of the photon as the measurement particle. As the wavelength decreases and the frequency of the photon increases accordingly, one can determine the location of the atom with increasing precision, the atom

However, due to the energy of the photon, which increases with decreasing wavelength, is thrown away more when it hits it. In the case of measurements in the atomic range, this inaccuracy is the uncertainty principle, which states that certain measured variables, such as location and speed, are coupled and can therefore only be determined up to a defined value.

As the location measurement becomes more accurate, the speed measurement becomes less accurate.

Therefore, a value such as spatial uncertainty in quantum physics can never be zero, because then the speed or momentum would be fixed.

The theory of relativity

It is a geometric description of space, time and gravitation, taking into account movement and, in the case of the general theory of relativity, also acceleration, and its effects have so far only been understood by very few physicists. Their mathematical description is based on differential geometry with a summary of 10 field equations. The equal forces of gravity and acceleration bend space, shortening it and slowing down time. So much so that the theory of relativity at the event horizon of a black hole has infinite values and loses its validity because space becomes infinitely short and time comes to a standstill. Albert Einstein published the special theory of relativity in 1905.

In doing so, he used something already known, such as the principle of relativity, which Galileo had already recognized and which, contrary to Newton's laws, states that movement is not absolute but relative, since it depends on the state of the observer, as well as Maxwell's equations, which describe electromagnetism and the Lorentz contraction, which describes the length reduction and slowing down of the passage of time relative to the observer of moving objects, which was developed in 1892. In 1905, Lorenz developed the mathematical formulation of electrodynamics.

of gravity, but was unable to see the length contraction as absolute and assumed the existence of a true length alongside an apparent length. Like other researchers, he also believed in the existence of a key medium, the ether.

However, Einstein rejected the ether when developing the special theory of relativity, which he derived from the principle of relativity and the constancy of the speed of light, and thus created a new understanding of the universe. The special theory of relativity was further developed by Hermann Minkowski, who in 1907 designed the current concept of 4-dimensional space-time. However, acceleration was not taken into account and was only added to by Einstein in 1915 as part of his general theory of relativity, which he formulated with the help of mathematicians, in particular Marcel Grossmann and David Hilbert, on the basis of the findings of mathematicians such as Carl Friedrich Gauss. Einstein drew on the considerations of the physicist and philosopher Ernst Mach that even under the influence of gravity, movement is relative to other objects, whereby he recognized that gravity and acceleration are to be regarded as equivalent, although at times he took the wrong approach, by initially not recognizing the general covariance as correct. When his work was published in October 1915, he was still using erroneous field equations, which account for the local energy and momentum

conservation not taken into account. The following month, Einstein then published the applicable field equations.

black holes

They were discovered by John Archibald Wheeler, who meant the term as a joke. However, it sounds exciting, so it quickly caught on, contributing to the misunderstanding of black holes by almost all physicists, who took the term literally and took a wrong turn. The Einstein equations can be solved through the understanding of black holes and a theory of quantum gravity can be created by connecting the theory of relativity with the quantum theory.

Like elementary particles, black holes have only 3 properties, mass, angular momentum and charge, where we assume that the sum of the charges of the incident matter is close to zero, so that for the Mathematically, the Kerr metric for black holes electrically neutral rotating black holes. In the Kerr solution, mathematically, instead of a point singularity, a ring singularity occurs and there are 2 Hori zone.

There is a maximum rotation speed, which is close to the speed of light at the equator, above which the hole would rupture. The space between the outer event horizon and the inner one, also called the Cauchy horizon, is called inner ergo-

called sphere or inner killing field. Already beyond the outer horizon, the first of the two so-called killing fields or ergospheres begins and the room rotates with it, the so-called frame dragging, which corresponds to the lens thirring effect discovered in 1918. At the outer event horizon, the radial orbital speed is equal to the speed of light, so that particles come to a standstill there due to the time dilation and cannot cross it for any observer who is not part of the event horizon themselves. The universe ends there physically.

According to calculations, the black hole in the center of our galaxy rotates at just over 10% of its maximum speed; the fastest seem to be rotating at the physical limit. The fastest for

The rotation speed measured for a black hole is 950 per second, and the measured particles are not emitted near the event horizon, so the time stretch is still small.

Already in the surrounding accretion disk, the matter is strongly heated by collisions, whereby many high-energy photons are emitted, partly bundled as jets over the polar caps by the strong magnetic field. In the penultimate stage of the gravitational collapse, in which the electromagnetic forces throu

If gravitation is overcome and neutrons are produced, each neutron is shattered into its basic components, photons. According to calculations, a neutron consists of about 1.416×10^{42} photons, whose total energy corresponds to the neutron's energy of 939.565 MeV. According to the holographic principle, the event horizon would then expand by 5.664×10^{42} Planck surfaces for a non-rotating black hole and, depending on the angular momentum, up to almost 50% less for a rotating black hole, with the number of photons increasing from their energy dependent. When a neutron is annihilated by an anti-neutron, only 2 photons are created, each. If a photon of sufficiently high energy collides with another photon, for example from the field of an electron bound to an atom or a particle of an atomic nucleus, one or more protons with their antiparticles and other particles, such as photons, can result as an interaction. The energy of the photon just has to be higher than the energy of the particles produced.

Due to the time dilatation resulting from the theory of relativity, a photon comes to a standstill immediately in front of the previous event horizon, enlarging the previous event horizon and together with the other photons of the black hole

forms its new event horizon. The information of the 4-dimensional space-time is stored on the 2-dimensional surface of the event horizon, which is one Planck length thick and consists of adjacent photons that have a distance of 2 Planck lengths from each other. This holographic principle has been developed by several physicists since the early 1990s. Applied to space, this means that it is a plane.

To illustrate what exactly happens near a black hole, let's take 2 astronauts named Isaac and Albert who can observe each other through powerful telescopes and who are in their spaceships. Isaac stays at a safe distance and Albert drops into the hole, which is non-rotating for the sake of simplicity, as the result is the same as a rotating one. We have to ignore the fact that astronaut Albert falling into the black hole was torn apart by the forces occurring well before he reached the event horizon and part of him was ejected in the form of high-energy particles.

Isaac sees that his colleague Albert, who has switched off his drive, is falling vertically into the hole, moving away from him faster and faster, while Albert's clock runs slower and slower. In case of further

Approaching the hole, Albert slows down and finally stops just before the event horizon. We ignore the fact that Albert becomes invisible due to the strong red shift just before the event horizon and at some point not a single photon from him reaches Isaac, although the probability that one still arrives is mathematically never zero, it only decreases greatly. Similar to turning off a lamp. If Isaac watches long enough and the hole grows, Albert's spacecraft would reapproach it, along with the expanding event horizon.

Even if Isaac observes his colleague Albert for billions of years, Albert does not reach the event horizon. If the black hole would continue to grow permanently and gradually swallow all matter in space, including the other black holes, Isaac and his rocket would eventually, as the last remnant of space, no longer be able to oppose the gravity of the hole and would fall, as the first possibility likewise in calculable proper time in the direction of the meanwhile cosmic event horizon. According to the theory of relativity, it would experience a big crunch, the opposite of the big bang, the big bang, where it would merge with the hole in an infinitely dense point, as would be the case at the beginning of a big bang. When the big crunch turns into a big bang again, an immortal Albert would be the next

Experience the big bang and the new development of the universe up to the big bang after that, where it would go on indefinitely.

This pulsation hypothesis as a second possibility solves the question of what came before and after by means of an eternally recurring universe. In the geocentric world view before Galileo, the myth was widespread that the earth rested on the back of a turtle. Of course, this suggests that it is resting on the back of another turtle. Logically, then, space consisted of an infinite series of tortoises.

However, a big crunch contradicts the observations that lead to the assumption that the universe is expanding due to so-called dark energy, which is why most physicists believe that the universe is expanding forever, the so-called big rip, as a third possibility. Then it would have a temporal beginning, but no real end. If dark energy is actually stronger than gravity, in about 10 to the power of 100 years the universe would be so diluted that there would not be a single real particle left in our observable universe. All the stars would have been burned out and their neutrons and protons foresighted

disintegrate. Even the black holes would be ver
steams. The universe then strives towards thermal death by reaching a thermal equilibrium in the infinite future, when quantum mechanical forces

how the zero-point energy and the vacuum fluctuation are not taken into account.

An immortal Isaac can be in a temporally immortal observing the black hole indefinitely in the expanding space, due to Hawking radiation, which is based on virtual matter-antimatter pairs or photon pairs spontaneously created by vacuum fluctuations, whereby occasionally one of the particles escapes the gravitational field and becomes a real one. Particles will, however, vaporize the components of the hole. Here, Albert is slowly transformed into the particle that left the black hole.

The fourth and final possibility is that space is stable, has neither a beginning nor an end in time, and the hole exists forever, with the evaporated matter being replaced by matter falling into it. Even then would Albert gradually convert into Hawking radiation, mathematically never completely, but at some point not a single particle of Albert would be part of the hole.

The following happens for Albert: He is in free fall while Isaac's clock is running faster and faster and only feels one when he is getting very close. Force pulling it apart, called tidal force because its side facing the hole due to the low

further away from the event horizon is attracted more than its opposite side. This is especially true for a stellar black hole, the remnant of a collapsed star, which emerges from its supernova at about 25 solar masses, with a large part of the matter being ejected. For a galactic black hole, which is at the center of galaxies and has a mass between a few hundred million and a few billion solar masses, the tidal forces are smaller and thus less relevant. It is much larger than a stellar black hole, which has a Schwarzschild radius of about 75 km at 25 solar masses. At a distance of one and a half times the Schwarzschild radius, which in Einstein's equations corresponds to the distance from the center singularity to the event horizon, Albert's hole has expanded so much that it becomes flat and occupies half of visible space. In the very short time that Albert calculated before reaching the event horizon, the black hole grew larger and contracted in a circle around it, the visible universe outside lay behind it, increasingly resembled a disc and became rainbow-colored, red on the periphery, blue in the center as it gets smaller and smaller and Isaac's clock ticks faster and faster. Upon reaching the event horizon, Isaac's clock, as well as all other clocks in space outside of event horizons, would go to infinity

run fast. All movements and processes were also infinitely fast, while space would have shrunk to a point. According to the theory of relativity, from his point of view Albert is infinitely fast when he reaches the event horizon, an infinite amount of time has passed in space and he unites with space in an infinitely heavy point, or in a rotating black hole in a one-dimensional ring. Since this is not possible, the theory of relativity becomes invalid at the event horizon. It collapses by declaring infinite values and time stands still there for any outside observer. The short calculable intrinsic time of the fall is never quite reached since it corresponds to an infinitely long period of time outside the event horizon. Upon reaching the horizon of events, Albert would be in the infinite future and thus at the end of all times. This fact was overlooked for generations of physicists, so that to this day reports of crossing the event horizon and then falling into the singularity are reported, with nobody being able to explain what happens between the event horizon and the singularity. People then like to refer to Kruskal-Szekeres coordinates, a mathematical tool that allows calculations to continue beyond infinity, which shows that these physicists neither understood the term infinity nor the difference between

to have. The singularity is a mathematical solution with an event horizon beyond which, the name is appropriate in this case, there are no events and therefore no space, no time and no particles. Space ends at the event horizon. The term black hole is misleading. Black area would be correct.

But could it be that such a simple and logical connection has not been understood by physicists for generations? It can, because before logic comes the ego and before the physicist comes the professor who tells something that a budding physicist has to learn and reproduce in order to become a physicist. Otherwise, the professor who is unwilling to have a student explain his views as wrong will fail him. He would feel embarrassed. This is about reputation and career as well as the loss of the previous world view, which is usually felt to be unsettling. A sociological problem. Most of the time people learn by heart and copy from each other, although many still dream of the Nobel Prize.

Worse still for the physicist ego, which sees itself as the grail guardian of the mother and queen of science, would be if an unbiased non-physicist, whose knowledge of mathematics hardly progressed beyond elementary school level, recognized this simple, logical connection, something that generations of misinformed physicists have not been able to do location were. It ca

not be what must not be. It is therefore best to practice ostrich politics and ignore the matter. If this is not possible, the reflexes of the instinct of self-preservation take hold and the facts are obscured by pseudo-arguments.

Due to the complexity of physics and the mathematics that describe it, physicists tend to lose sight of the essentials in this often abstract and demanding field of study. you lost

In order to maintain their cherished world of ideas, they sometimes find themselves in the forest of mathematics, with which they violate physics by, if necessary, continuing to calculate beyond infinity, such as the event horizon, or arbitrarily inventing a variable such as inflation, even if this, along with other unphysical assumptions about the Big Bang, such as a naked point singularity as the initial stage of the universe, violates fundamental laws in order to be able to uphold its Big Bang theory. Logic is also relative, above all relatively unimportant compared to the ego. A psychological problem.

What happens to the particles just before the event horizon?

At some point gravity becomes stronger than the other 3 forces. Once they have the electromagnetic force

exceeded, the electrons are pressed into the protons. If it stayed that way, we would have a neutron star. When the strong nuclear force is exceeded, the quarks and gluons that make up the neutrons are crushed into their components, the photons. Assumed states in the form of a quark gluon plasma or a gravitational Bose-Einstein condensate at the event horizon are speculative mathematical models and at best intermediate stations. If they are not ejected beforehand, the photons are integrated on the surface at the event horizon, taking into account the angular momentum, the magnetic field, the angle of incidence, the direction of incidence and the area of incidence. The black hole does not grow in radius, diameter and circumference in relation to the 3rd power of the mass like a sphere with four thirds pi times r to the power of 3, but directly proportional to the 1st power. With twice the mass, r , d and u double. The black hole thus grows disproportionately to the 2nd power compared to a sphere. It is possible to calculate with elementary school mathematics how big a black hole would be if it had the mass of our universe. The Schwarzschild radius of our sun times about 1.5 trillion solar masses in our galaxy times 1 trillion galaxies, not counting dark matter and dark energy, which are said to make up about 95% of the total mass. The result is

surprisingly in the range of the size of our universe.

Due to its light-like properties, the event horizon lacks 2 dimensions, path and time, just like for photons, the basic units of the universe. In their own frame of reference, photons are only infinitely fast if they actually have no rest mass.

However, since quantum mechanical processes appear to be time-independent, we can assume that photons have no rest mass.

The root cause of the formation of a black hole is self-reinforcement, since the gravitons, which are probably never directly detectable as gravitational carrier particles, also attract each other, which, through coupling processes, leads to a collapse at a certain concentration, which is stabilized by the smallest possible photon distance at the event horizon.

time travel

An example that is often used to illustrate the relativity of time is the so-called twin paradox. As with falling into a black hole, we again take 2 astronauts who are twins. Isaac stays on Earth while his twin Albert embarks on his spaceship journey. This has a photon drive and consists almost exclusively of fuel, half matter, the other half antimatter, which is separated from matter by a strong magnetic field so that the spacecraft does not explode as annihilation, the strongest physical reaction, whereby Photons remain in the form of gamma rays. We ignore the fact that such a rocket, which reaches almost the speed of light, will probably not be able to be constructed in the future either. Albert says goodbye to Isaac and accelerates with the force of gravity of 9.81 m/s^2 he is used to, because a much stronger acceleration would crush him. At this acceleration, Albert would reach the speed of light after around 355 days. Albert passes the time as best he can and, when he is no longer far from the speed of light, observes through the window of his spaceship that space is becoming increasingly colorful like a rainbow. The galaxies are getting bluer in front of him and redder behind him. He will

faster and faster and, shortly before reaching the speed of light, travels many light-years per second. Due to the fact that it consists of atoms that have a rest mass, it cannot quite reach the speed of light at which it would be infinitely fast and heavy in its own frame of reference, since it would require infinite amounts of thrust energy to do so. However, when it approaches the speed of light to within a few Planck lengths per hour, it is already traveling many billions of light years in fractions of a second. Already decelerating a little below that speed, he accelerates towards Earth, decelerates again and finds that his twin has long since died and, by the time he is very close to the speed of light, that the Sun has long since burned out to a white dwarf . It took him almost 4 years for his journey. If it could survive a much greater acceleration without being crushed, it could travel to galaxies billions of light-years away in a fraction of a second.

explanatory models of the universe

The difference between the theory of relativity, which as a geometric description of gravitation is not a quantum theory, whereby all processes take place continuously within the framework of the theory of relativity, and the quantum theory, which describes the 3 other forces, is that the amount of information in the theory of relativity is not limited. Thus, an infinite amount of information is available to each particle, while the amount of information of the particles described in quantum mechanics is limited, which reduces the ability of particles to move in a targeted manner. In addition to its frequency, a photon has only one property, the spin, which can assume two states. It thus appears to have only 1 bit of information. Because a high-energy photon can create other particles, including photons, it contains more possible bits. Despite the quantum tunnel effect, lightning can only detect and use a discharge possibility over a distance of around 30 m due to its limited information capacity, up to this distance its movement is not targeted.

The theory of relativity usually plays no role in the transmission of particles. Otherwise, in the double-slit experiment, each particle would have to bend the space in a different way according to its path,

However, this is not possible, since the particle only has a defined path through its measurement, before that it only has a probability of being there.

The best-known hypothesis is to describe the universe mathematically by quantization of the theory of relativity together with the quantum theory, which does not deserve the common name theory because it does not make any verifiable predictions, can only be represented mathematically with at least 7 additional dimensions that cannot be verified and in countless variants can describe countless different universes is the so-called string theory and the superordinate M-theory. She attempts to describe the universe using one-dimensional threads, so-called strings, and two-dimensional membranes, branes, as well as higher-dimensional particles. There are around 10 to the power of 500 variants and it can describe numerous different universes, which is why it cannot say why our universe with its particles and natural constants is like this and not different.

The alternative hypothesis to explain the universe is this Loop quantum gravity, which describes space as a lattice spaced one Planck length apart Gravity is thus quantized and verifiable predictions made possible, such as the speed of photons depending on their frequency

changes the lattice structure of space slightly. According to calculations, the universe would consist of about 10^{184} grid points. Studies of gamma-ray spectra from distant stellar explosions seem to confirm the differing light travel times, but are not yet sufficiently significant. Loop quantum gravity, like the theory of relativity, needs no background, it itself is the stage and an extension of the theory of relativity. She, too, can only explain the universe to a limited extent and does not take quantum theory into account.

The Big Bang Thesis

The so-called Big Bang theory, according to which the universe is said to have originated around 13.7 billion years ago, is not a theory because it cannot be verified. After all, we cannot reproduce a Big Bang. Nor is it a hypothesis, since it is not free of contradictions. It contradicts both the theory of relativity and the quantum theory and is therefore unphysical. The cause of the big bang is given vaguely with an extraordinarily strong quantum fluctuation. One rationale for a Big Bang is the cosmic redshift, which is interpreted as an extension, with this extension calculated back 13.7 billion years leading to a point. However, like dark energy, the redshift can also be attempted by the gravitation of more distant objects. Another reason for the Big Bang is the cosmic background radiation, but this too can have other causes.

The fact that no very old objects have been detected so far speaks for a development of the universe. Although the age of globular star clusters has been reported to be up to 18 billion years, the measurement inaccuracy is considerable, so that their age is currently given as around 10 to 13 billion years.

In the Big Bang, everything came into existence from nothing

corresponding to an extensionless point, which is unphysical, since in physics there can be no extensionless point with infinite density and temperature. Even photons, as the smallest particles, must have a minimum distance that cannot be less than a Planck length. This point is said to have contained all information about the later universe, including the later space, which is said not to have existed before, so that space is said to have arisen on levels far below an atomic nucleus, without being able to explain what space actually is and how it can arise. In addition, almost as much antimatter as matter would have to have been created, whereby due to the small distances within the framework of the strongest physically possible reaction, an immediate annihilation in gamma photons would have taken place, which through collisions immediately again form matter antimatter pairs, which annihilate again, until an excess of matter would have formed due to the CP violation. Infinite density also means infinite gravity, which is why an unknown force, even if infinitely strong, couldn't make that point pop. A point universe as the initial stage also violates a fundamental physical law, the second law of thermodynamics, according to which the entropy of any closed system can never decrease. The final stage of the universe is

accordingly, when all energy has been evenly distributed, so that all processes come to a standstill. The heat death. The universe as the starting point is exactly the opposite and thus the most improbable state. Another exclusion criterion for the existence of a Big Bang is that, according to Einstein's equations, a black hole will inevitably form at a certain matter or energy density, which has an event horizon that, given the assumed mass of the universe, is surprisingly about as large as this everything is. However, shrinking beyond the event horizon is not possible, since the photons are already very close together there.

In order to be able to explain the uniformity of the cosmic background radiation, what is known as inflation was also invented in the form of a mathematical variable, otherwise the Big Bang thesis could not have been upheld and would long since have been history as a curious error of science. Inflation is said to have set in shortly after the alleged creation of space out of nowhere. After about 2 billion Planck times, corresponding to 10^{-35} seconds, before which the universe is said to have expanded at the speed of light, it is said to have temporarily expanded to the size of an apple at a multiple of the speed of light due to a temporary false vacuum of subatomic size.

have bloated. Inflation is said to have disappeared about 10 to the minus 32 seconds after the Big Bang as spontaneously as it appeared. What does not fit is made to fit.

In addition, the universe seen from Earth looks in all directions look the same, so we seem to be close to the center. Our gravitational center is assumed to be the center of the currently largest known gravitationally bound system, the Shapley Supercluster, whose center is about 650 million light years away. Another possible center is the Norma galaxy cluster, about 210 million light-years away in the large attractor. After a Big Bang, we would be expected to be somewhere between the center and the rim. But then there would have to be more objects off-centre on one side than on the other. The popular example of a balloon where there is no center and where, as is assumed in space due to redshift, all points move away from each other when inflated, is misleading, since space, which has 3 spatial dimensions, cannot be equated with a rubber skin is. It would be unlikely that we would be near the center after a big bang.

Clinging to the Big Bang mainly has psychological causes. For us almost everything has a beginning and a

End. We cannot imagine an eternal universe that has always been there and will therefore always be there, our brains are not made for that. It worries us and, in the absence of creation, eliminates the need for a Creator, which over 60% of humanity believes in. Since there could not have been a Big Bang, it can be assumed that the universe did not come into existence and is not temporally unlimited. At least we cannot assume that it is limited in terms of space and the number of particles.

The assumption that space arose together with the Big Bang was necessary because the light from the most distant known objects traveled to us around 13.2 billion years, which means that when this light was emitted around 13.2 billion years ago these objects were already around 13.2 billion light-years away from us, which is not possible after a big bang 13.7 billion years ago, since they could not have been more than 0.5 billion years away when their light was emitted and that It would also have taken only 0.5 billion years for light to reach us. There had to be room for it to fit. The common rationale is that the theory of relativity links space and time, which is true in that matter and energy particles warp space. Without particles, space would be flat and therefore non-existent. However, that doesn't mean that

it arose at some point with the particles. The universe would have at the time of light emission of these distant particle would have been more than 10,000 times smaller in volume, and with its hundreds of billions of galaxies 0.5 billion years after its formation, it would not have looked any different than it does now, despite over ten thousand times higher energy density, since the objects that we observe at the edge are moving away from those nearby do not differ significantly. These objects would now be around 25 billion light years away. Traveling to you at almost the speed of light, since they appear to be moving away from us at about 93% of the speed of light, would take several hundred billion years if these objects continued to recede unchecked. However, due to the increasing expansion, known as dark energy, these objects would be much further away.

How can such contradictions be resolved in principle? Not physically, but mathematically. With mathematics as a universal tool, calculations can even be continued beyond infinity, which is what is done with black holes when, as is customary, it is said that matter falls through the event horizon. Despite this, the fact that this has nothing to do with reality and logic does not bother the physicists who refer to it, they usually already realized during their studies, where it is mainly about learning by heart,

lost in the forest of mathematics they don't really understand and confuse it with physics.

In the case of a big bang, the space would have to have arisen and continue to arise on the smallest scales, far below the size of an atomic nucleus, including between atomic nuclei, atoms and molecules. However, we know that the distances between them are not increasing, otherwise everything would fall apart. Even if space were only to expand outside of the molecules, this would not allow for stable planetary orbits or galaxy rotations, since the distances between these gravitationally bound objects would continuously increase. How can you think of something like that, against all logic, for which there are no signs whatsoever, without being able to justify it physically or even mathematically? A psychological problem. Before logic comes the ego, which is reluctant to say goodbye to familiar views and certainly does not allow itself to be robbed of its world view, especially when there is no alternative in sight, the others have the same views and one is therefore in good company. However, the complexity of physics gives enough room to move beyond the secured as a world explainer to increase his fame and impress his audience. People often talk past each other and there is lively s

After all, the term sounds at least as exciting as black hole. It doesn't matter that there isn't the slightest hint that something like this could exist. People also like to speculate about time travel into the past, although a return to the past not only violates the theory of relativity, since it would require faster than light speed, but is also impossible for reasons such as violating causality. Only the entire universe could move back in time at the same time, which is in principle impossible. There would have to be a decrease in entropy, which would also have to put a dropped, cracked plate back together exactly as it was before, which violates the 2nd law of thermodynamics. Something like that is ignored and tachyons are invented that are faster than light. The multiverse theory does not deserve this name either, but it is nevertheless a formally consistent hypothesis. Unfortunately, it doesn't really make sense because it claims that with every quantum leap, and thus with every change in space, another space is created. Like string theory, it can explain everything, but it doesn't make any predictions or explain why the universe is like this and not different. In addition to the fact that all masses are then extremely often multiplied and alls are created, the number of alls would no longer be mathematically comprehensible in practical terms, since, for example, the largest Rubik's Cube to c

consists of 2,691 parts, has 4.3 times 10 to the power of 1,795 possible solutions, whereas the estimated number of atoms in space is around 10 to the power of 80 to 10 to the power of 89, vanishingly small, with this difference of a billion times more showing how imprecise and the estimates are speculative. Even world-renowned physicists like Stephen Hawking, who at times assumed that time could be reversed in a big crunch, repeatedly got lost in the complex field of physics and mathematics, but often let their colleagues drift off too far into unphysicality and implausibility catch again. For example, after 30 years Hawking confirmed a bet as lost in which he erroneously advocated the loss of information from black holes, but his explanation in this regard was hardly understood.

Albert Einstein received the Nobel Prize for his findings on quantum mechanics, but he was not prepared to accept the consequences, which he expressed in his sentence "God does not play dice", because he did not want to accept that a quantum mechanical state until the measurement is indefinite. It was not possible for him and his colleagues to recognize that we as observers are the dice makers. The thoroughly self-critical Einstein described his cosmic constant as the biggest foolishness of his life, with Edwin Hubble explaining the redshift he discovered in 19

as the basis of this constant as the galaxies moving away from each other, the faster the further away they are from us, but not as a previous compression up to a point. The big bang thesis was brought up in 1927 by the theologian Georges Lemaitre, who assumed a primordial atom as the initial stage. Almost everyone gradually jumped on this bandwagon and Einstein's picture of a static world view no longer seemed tenable to him. In 1948, the current idea of emergence from absolutely nothing came up. To this day, the churches are advocates of the Big Bang thesis, since no universe that has not come into being fits their world view.

Where no creation has taken place, there is no room for a creator. So once again the wish was the father of the thought. Psychologically, like the big bang theory and the misunderstanding of black holes, this can be seen as mass suggestion through peer pressure. The well-known behavioral researcher Konrad Lorenz had the following to say about this: "The massing is a really bad compulsion. When many people believe the same thing, they easily come to the (wrong) conclusion..."

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There is a simple explanation for the redshift, which increases towards the edge of space. That amplification is dark energy, which appears to make up about 70% of the mass of space. An equally span-

awe-inspiring term like black hole, which has contributed significantly to the popularity of physics. Contrary to previous assumptions that dark energy is caused by vacuum fluctuations, with the experimentally confirmed and predicted values deviating greatly, so that this thesis is also purely speculative, the outwardly increasing redshift cannot be caused by the relative speed to us, but by caused by the gravitation of objects lying behind it, which are not visible due to the excessive redshift. If, that would be the simplest explanation, it should only be an object that completely encloses us, we are in a cosmic black hole, which in this form definitely does not deserve the word hole, since, like all black holes, it is physical is a surface. The universe would then be spatially limited by a cosmic event horizon. Another possibility is that space is infinitely large and that the red shift with increasing distance is due to the attraction of the infinite number of more distant bodies. On the other hand, the fact that the red shift increases towards the edge of space instead of constantly increasing speaks against it. Another attempt at an explanation is light fatigue, in which light loses energy as it travels through space, but there are no signs of this.

Although we can build highly complicated things like computers, our minds are sometimes overwhelmed by simple geometrical conditions. It was only in the 1990s that an explanation was published as to why there are high and low tides almost twice a day, even though the moon, which is the main cause, circles the earth just under once a day. It was realized that the earth also orbits the moon, only to a lesser extent because it is heavier. If the earth and moon were of equal mass, the axis of rotation would be exactly halfway between the two. However, because of the difference in size and weight, the axis of rotation is within the earth, between the center and the surface, the earth just wobbles instead of rotating. On the side of the earth facing away from the moon, the tide is generated by the centrifugal force resulting from this movement, on the side facing the moon by the moon's gravity.

However, we cannot clearly understand properties of elementary particles such as spin, which is not a classic rotational movement about an axis. In our geometry, a particle rotating about an axis is oriented as before when rotated 360° . However, this only works for elementary particles with a spin of one. However, there are also those with a spin of $1/2$ or 2 . In the first case, you have to

the particle only has to be rotated by 180° , in the second by 720° , in order to bring it into the previous state.

The solution of the Einstein equations

The general theory of relativity, which is summarized via Einstein's field equations and described by means of 10 coupled non-linear differential equations, can be combined with the quantum theory to form the theory of quantum gravity, and thus the solution of the Einstein equations is possible without breaks with the sum zero arising in the denominator, where the numerator becomes infinite, so the theory doesn't make sense. The zero distance between particles and the outer event horizon of a rotating black hole does not occur because the difference in distance, due to the enlargement of the event horizon due to the particles moving towards the event horizon in the form of photons as a decay product of matter through annihilation at close proximity, is taken into account must become. Due to the enlargement of the previous event horizon caused by each photon, a photon only reaches the new event horizon, which has been enlarged by its energy, and becomes part of it. The denominator of the equation is then the distance zero from the Schwarzschild radius r plus the distance to the event horizon enlarged by the photon, with the smallest possible distance being in the range of a Planck length. A black hole does not have a physical radius because it is a surface and therefore has

Event horizon ends. According to the holographic principle, the new event horizon increases by four Planck areas at a distance of one Planck length from the old event horizon, the lowest possible entropy and information, one bit, the unit of action of the universe. The information content is proportional to the area and no information is lost. The mathematical combination of the quantum theory with the theory of relativity to form the theory of quantum gravity can thus be formulated without contradiction, taking into account the fundamental natural constants of light speed, gravitational constant and Planck's constant of action.

resume

The universe did not come into existence. It is eternal, as Albert Einstein, who did not believe in a Big Bang, suspected, even if it were to change over time. There is a material cycle due to recycling. This cycle is stable due to the formation of around one hydrogen atom per year in one cubic kilometer of space. Black holes with their jets resulting from the magnetic fields are part of this recycling.

The 4-dimensional space-time of the universe that can be described in 2 dimensions is a phenomenon that is caused by the observer. Space is spatially limited by local event horizons in the form of stellar and galactic black holes. These have no physical content. The universe ends at its surface, the outer event horizon. Photons are the basic stock on the event horizon parts of the universe. The universe also seems to be surrounded by an event horizon as an outer boundary. Dark energy is due to the gravity of this cosmic black hole.

The universe can be best described by its natural constants, its forces and its particles, their spatial position in space, their speed and their direction of movement, with the particles

if they are not photons, come from photon collisions. Mathematically formulated that would be the so-called world formula. An explanation as to why the natural constants have these and not other values is probably beyond our ability to recognize. The whole thing is more than the sum of its parts. A universal formula or theory of everything cannot explain all chemical and biological processes and therefore cannot say why you are reading this text now.

biological aspects

Humans, whose basic structure is encoded in their DNA, are the result of at least 4 billion years of evolutionary adaptation and optimization. If the ancestry is traced, 2 parents who reproduced while alive, who had 2 parents who also reproduced and so on, after 30 generations the number of direct ancestors is already over 1 billion. A worm whose ancestors were genetically identical to humans about 350 million years ago still has about 50% of our genes, and after 2 billion years there comes a point when animals and plants were still the same evolutionary strain. Due to this continuous adaptation of the global gene pool, a chain of information that has been uninterrupted since the beginning, man is the outstanding product of a symbiotic universe on this planet due to his networked abilities, which are based on Darwinian principles.

An exact distinction between living things and non-living structures is not possible. Viruses are not considered to be living beings because their existence is linked to living beings. The cell is the basic unit of life. Substances are constantly being produced and passed on in it. A cell is structured so complicated

that their detailed function has so far only been understood to a limited extent. As in a factory, different materials are produced and transported in specific quantities at specific times at specific locations. Quantum effects, such as the tunneling of electrons, play a major role. Photosynthesis, which is the basis of plant life, which in turn is the nutritional basis of animal life, is based on quantum mechanical laws in which networking plays a major role. The increasing interconnectedness within the framework of evolution imitates the interconnectedness of the quantum world on a higher level. This can be viewed as a double-edged sword, since the increasing control options can be used not only to reduce creativity through restrictions on individual freedoms, but also to prevent crime. Equally ambiguous is the fact that networking and technological advances increase the potential possibilities of the individual. For example, if even one person has the ability to release an extremely deadly and contagious virus from a biolab, whether for revenge or other destructive reasons, it could mean the end of humanity. Planetary evolution is a highly symbiotic network.

She is tough and strives for improvement. Most of the biomass is below the earth's surface in the form of anaerobic protozoa. The frames-

Conditions for higher organisms were created by the production of oxygen as a by-product of the metabolism of a bacterium which, around 3 billion years ago, ensured that all other previous organisms that metabolized without oxygen and were therefore called anaerobic, were pushed back and for about 2 billion years have only existed where it is too uncomfortable for the aerobic, oxygen-utilizing and therefore more efficient creatures. Humans resulting from evolution consist of approximately 100 trillion cells. According to current calculations, around half of these, and according to other calculations significantly more, are genetically non-human, with the majority of these cells being bacteria that are mainly found in the intestine and live symbiotically with humans. Up to 50% of the metabolic products contained in the blood are excreted by bacteria, which in turn influence our feelings and behavior. Neurotransmitters such as serotonin and hormones such as testosterone and adrenaline are not only produced by the body's own cells, but also by symbiotic protozoa. Stress, for example, can disrupt this so-called microbiome and lead to heart attacks, obesity or cancer.

Evolution often takes unusual paths. Protozoa, for example, do not have to be microscopically small.

A bacterium was discovered that reached a size of 2 centimeters. The evolution of living beings toward increasing complexity and interconnectedness appears to occur sustainably as circumstances permit. The goal of evolution is information gain through networking for the purpose of information exchange. Information seems to be the currency of the universe. The information about the structural plan of every living being is encoded in its DNA using base pairs that are the same for all living beings. Humans have around 3 billion base pairs, which corresponds to 3 gigabits, in which all information about the complex structure is stored using differently structured and specialized cells. Mutations in DNA occur spontaneously due to proton tunneling according to quantum mechanical rules, which are assumed to be random. Little research has been done on the extent to which humans can control their DNA through mutations, other than through their experiences. The still relatively new branch of epigenetics deals with genetic adaptations through changes in genes using chemical changes based on experiences that living beings have and are passed on to their descendants without changing the gene sequence as in the case of a mutation. Genetic changes caused by mutations that are not random exist as enemy imprinting programs to protect against predator attacks,

why, for example, greylag geese, which the behavioral scientist Konrad Lorenz studied, flee from a fox even if they have never seen one, since one of their ancestors was attacked by a fox and survived, with the shock of the attack causing an imprint-sensitive state that anchored the image of the enemy in the DNA via RNA messenger molecules. For example, there seems to be a knife protection program in place for both gray geese and humans. Knives are weapons that are thousands of years old. Due to the doubling of the direct ancestors in each generation, 2 parents who have 2 parents, who have 2 parents and so on, after 30 generations the number of mankind at that time has already been reached with over 1 billion, with at least one, probably numerous of the ancestors have been attacked with a knife, suffered shock and may have been injured before reproduction has taken place. This experience warns descendants of knife attacks and triggers reactions to resist the attack. In the case of pistols, this program is not pronounced in geese either, since these are fairly new weapons and in most cases none of the ancestors was injured by a pistol. Another genetic program, many millions of years old, is to see into the future. Its function is to evade predators and hunt successfully. The brain projects the movement of the object here-

in the case of the perception delay caused by the conduction of stimuli via the nerves and evaluation by the brain, approximately 0.1 seconds into the probable future. When thrown with force, the ball appears to be up to 5 meters ahead of its perceived location. This effect can be noticed with an insect that flies from the outside against the glass pane of a room and at the moment of the impact sound seems to have continued its path for a few cm when it goes out in the room. So it seemed to have flown through the pane.

Even brainless protozoa have amazing abilities. They can move, flagellates and sperm are typical examples. They smell and taste by sensing molecules in their environment, hear by registering pressure waves in air and water, and feel by sensing temperature differences, but far less complex than we do with our 100 billion brain cells. Many animals have senses that we humans do not have and the way they work is not fully understood on a quantum mechanical basis, whereby the quantum states of several milliseconds last astonishingly long and the causative molecules are not known. Birds use the earth's magnetic field to find their way around, hammerhead sharks are

The receptors they hold are specialists in detecting electromagnetic fields, so they can detect motionless prey buried in the sand by the electrical signals of the heartbeat. An electric eel, on the other hand, can generate strong electrical fields for defense and stun predators with electric shocks of almost 1,000 volts and even cause horses to drown, as the natural scientist Alexander von Humboldt has already described. The communication between living beings is complex and at best only partially understood. Plants use chemical signals to warn their neighbors about predators, which causes the neighbors to produce toxins. Bees use movement to tell their colony about the type and distance of food sources, and every ant in a colony that communicates primarily by means of chemical signals can gauge the strength of an opposing colony and react accordingly.

Humans as cosmic players and designers are apparently able to use their brains to cause unusual phenomena based on non-local quantum mechanical rules. A large proportion of people have had at least one paranormal experience. Scientific studies have shown that these events occur primarily in special psychological situations such as stress or when making important decisions that

ken emotions are connected, occur. People who are prone to epileptic seizures, in which unusually strong electrical fields occur in the brain, are more likely to be affected. These are physically rather weak effects, such as popping noises or lightning-like phenomena that occur similar to a catch charge in thunderstorms. Occasionally, these effects do not occur individually, but in a series of several, often 3, events. The problem of scientific proof lies in the lack of reproducibility.

However, most unexplained events have other causes. Prophecies can come about accidentally or as self-fulfilling through belief and subsequent actions, real seeing into the future seems physically impossible, and telekinesis of larger objects is probably not possible.

Behind spooky movements of larger objects, such as toppling cupboards, are either geophysical anomalies or, as is probably the case in most cases, people or animals. However, many mysteries remain, such as the numerous UFO sightings reported by military jet pilots over the decades, some of which are said to have been recorded by the on-board electronics. It also seems unlikely, given the number, that all of these sightings exist only in the minds of those reporting them as ima

are deliberate false reports, as no plausible motive can be identified. Extraordinary phenomena always occur within the framework of the laws of nature and usually have explainable causes. UFOs can also be man-made missiles, for example. It seems unlikely, but not impossible, that extraterrestrials are involved in some phenomenon, although it is premature to suggest this since there is no evidence of their coexistence on Earth, although it is extremely unlikely that humans are the most evolved creatures in of this vast universe and are thus the crown of creation, so that the existence of highly developed creatures in space capable of interstellar travel is quite probable.

astrobiology

DNA has existed for at least 4 billion years, possibly much longer, since there is strong evidence for the panspermia theory, according to which life is not only widespread in space, but also single and small multicellular creatures after interstellar journeys to us on the have fallen on earth and have enriched or even caused evolution. The probability is not small that there is life on celestial bodies in our solar system. A promising candidate is Jupiter's moon Europa, on which liquid water is suspected.

A large part of the stars seem to have planets. In order for these exoplanets to be inhabited by lower or higher developed life forms, several factors must come together.

In addition to a certain temperature constancy, a non-toxic atmosphere and a magnetic field that protects against high-energy cosmic radiation appear to be essential for the emergence of life outside of oceans. In addition, many planets have large temperature differences of up to 1,000 degrees between the side facing the sun and the side facing away from the sun, which makes life near their surface impossible. Whether the occurrence of liquid water on the surface of a planet is absolutely necessary for the emergence of higher life is being determined in

controversially discussed. Nor can it be assumed that life, like on our planet, is based exclusively on carbon and is only possible in moderate energy and temperature ranges, whereby the definition of the word life is also important.

Because in our galaxy alone there are probably at least millions, if not billions, of planets on which life is possible, life on many of them should be more highly developed than on ours. Even without a star orbiting a planet, life is possible, since the necessary metabolism on our planet has also been observed anaerobically, with 12 anaerobic substances known as food so far. There are even unicellular organisms that draw their energy from the radioactive elements uranium and technetium, with the decay heat of radioactive elements being responsible for the fact that the earth is hot inside, which is why habitable temperatures prevail in large areas of the earth's upper crust.

It only becomes hostile to life from a depth of a few thousand meters, so that the majority of the biomass is probably far below the earth's surface in the form of anaerobic protozoa. A fairly new branch of research deals with the emergence of life in interstellar space, among other things through the accumulation of water molecules and amino acids as the building blocks of life, which have already been detected th

cosmic dust particles. Surprisingly, it was found that bacteria growing on the outer shell of the ISS space station seem to be able to cope well with the local climate. These are species that occur on Earth, but this does not mean that they originally came from Earth are standing.

Since evolution is about resources, Stephen Hawking and Bill Gates, among others, felt compelled to warn that signals should be sent into space in order to draw the attention of non-hostile extraterrestrials to us. Extraterrestrials may also fear, based on experience, that a civilization detonating hydrogen bombs in their own atmosphere will pose a threat to them in the future, which requires a timely response. Humanity's strongest signal to date, the Tsar Bomb with more than 50 megatons of explosive force, should have been detectable over interstellar distances using highly developed detectors. However, it is likely that the cosmic colonization ability of larger beings is quite limited, otherwise an expansive race might have already conquered our earth. Evolution on other planets is not unlikely. In order to change the world with free hands, the local residents may have also developed the development from water to land, from cold

blooded to warm-blooded and to two-legged land creatures with prehensile arms made for climbing. Free arms, through transportation and construction, made human evolution possible, including the development of complex language. Barely visible to the naked eye, the tardigrades are the largest known creatures adapted to make interstellar journeys in space by using glucose molecules to avoid crystal formation during freezing, which damages cells. Since customization costs energy, it only makes sense when using the skills acquired through customization. So the hope of future colonization of space, or at least of our galaxy, is unlikely to be realised, since otherwise a more highly developed civilization would probably have preceded us long ago.

Another possibility is that for higher beings capable of interstellar travel, space is a cosmic natural park, leaving other civilizations to fend for themselves if possible. The ability to develop can be limited by cosmic laws or other living beings, but also by local events such as wars or diseases.

The approximately 4 billion year evolution on our planet should be over in a billion years at the latest, as the sun is getting bigger and bigger

and gets hotter before, after depleting the hydrogen in its central region, it swells into a red giant in about 6 billion years and expands close to Earth's orbit.

philosophical aspects

Humans function according to quantum mechanical rules that we cannot understand because the particle processes do not happen according to our ideas of geometry, space and time. In quantum mechanics, energy occurs in specific portions.

There is a fundamental fuzziness that turns man and the universe he observes into a system that can only be calculated to a limited extent. In addition, a large proportion of the processes take place virtually, outside of what is directly

measurable. These elementary processes, such as the tunneling of particles, which causes, for example, the slow loss of pressure in a car tire or the orbital stabilization of electrons bound to atomic nuclei, run below the Planck scale and can only be recognized by their effects, although they take place according to calculable rules, where the probability of tunneling decreases as the square of the distance. The quantum mechanical blur leaves room

If there were no blur and if the universe were complete and thus infinitely precisely defined, as vividly as clockwork, its description would require an infinite amount of information. In a fully fixed universe, an observer whose role is to make decisions would be redundant.

The accelerated development of mankind cannot continue for too long without people increasingly merging physically with computers and extensively modifying themselves through advances in genetic engineering. We can only predict the specific development to a limited extent. Leaps in development can be made, for example, by quantum computers. Just 2 generations ago, almost no one saw the internet and smartphones coming in the near future. Up to 15 generations ago there were no machines and our life today was not even imaginable. Norbert Wiener, one of the developers of computer technology, prophesied as early as the late 1940s that machines developed by us could continue human evolution.

All you need is a machine that can reproduce itself better than humans. A cyborg-like intermediate stage of man is also conceivable.

Exoskeletons are already being developed, the currently developing improvement of the senses such as sight, hearing and the brain, possibly with the help of implants such as chips, or optimization with the help of genetic engineering, is in the interest of many people.

Life can be described philosophically as the consciousness of the universe awakening within itself, whereby we create an image of the universe in our brains.

We should not pretend to be able to fully understand the principles of the universe, since our knowledge is limited to our body with its brain and is therefore very limited. Man received information about space from his surroundings. In philosophy, this corresponds to relational constructivism. There is a fundamental blur, space is not clockwork. Living beings thus have an unpredictability that can be interpreted as limited free will. Why there is life and consciousness and the All has these properties can be answered with: because it is so. Physicists call this the anthropic principle. From a physical point of view, life is about generating information in order to make decisions. Living beings create additional disorder through order and are chemically expressed as biocatalysts. They are a matter-bound energy wave that generates entropy through information. This wave of energy is in our body. Like everything else in space, this consists in its basic building blocks of spaceless and timeless photons, which we perceive through our eyes as light and through our body as heat.
